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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Redevelopment of Spectrum to	)	ET Docket No. 92-9
Encourage Innovation in the	)	
Use of New Telecommunications	)	RM-7981
Technologies	)	RM-8004

To: The Commission

SUPPLEMENTAL COMMENTS

Pursuant to Section 1.415 of the Commission's Rules, Alcatel Network Systems, Inc. ("ANS"), by its attorneys, hereby submits a Compromise Plan regarding the channelization proposal by the Commission in the above-captioned Further Notice of Proposed Rule Making,

CERTAINTY FOR MICROWAVE USERS COMPELS PROMPT ADOPTION OF THE COMPROMISE PLAN

Regrettably, the decision-making process for the FNPRM has become very counter-productive. No longer is this process a pluralistic evaluation of what technical rules should be adopted to achieve the highest level of spectral efficiency and to protect fully the needs of displaced 2 GHz microwave users. Instead, this proceeding has become a political contest driven by the Joint Commenters' unjustifiable claims in Congress and at the Commission that the 1.6 MHz-based channelization plan favors a single foreign manufacturer over domestic manufacturers, threatens path reliability, increases equipment costs and relies upon a "European standard."

As the public record clearly shows, these allegations are totally unjustified. Falsely characterizing the issue as a choice between U.S. manufacturers and a single foreign-owned manufacturer is unacceptable. ANS, with its long heritage as Collins Radio and Rockwell International, is a U.S. company which employs over 4,000 U.S. citizens and which develops and manufactures all the products affected by the FNPRM in the U.S. Can the other manufacturers participating in this proceeding make the same declaration? Indeed, would any of these manufacturers become pariahs and lose their U.S. identity if they too were acquired by a foreign corporation? Incorrectly characterizing ANS as a foreign corporation should be seen for what it is - - a tactic intended to divert attention from ANS' superior technical proposal.

The most unbelievable claim voiced by the other U.S.-based manufacturers to members of Congress is that ANS' proposal could exclude these manufacturers " from the low capacity microwave radio marketplace for at least two years, while they develop, design and manufacture

equipment that complies with the technical specifications of proposed rules."[4] This statement is completely wrong. In fact, Alcatel's Modified Plan clearly includes a two year "grandfathering" clause for existing equipment to be sold for the two year period after the applicable Commission rules are revised.

Microwave licensees, and the public safety, utility and other interests which rely on these systems, are being victimized by this political charade. Adoption of rules for microwave operation in the bands above 3 GHz has been delayed for over a year because other equipment manufacturers, which were invited by ANS to participate in developing a channel plan and which expressed absolutely no opposition to the 1.6 MHz channel plan when it initially was released for public comment, at the last minute decided to submit their alternative channelization proposal.

The record of this proceeding is abundantly clear that only the 1.6 MHz based channelization plan meets the present and future needs of microwave licensees. It most closely mirrors their current utilization and is much more spectrally efficient than the Joint Commenter Plan. Moreover, the 1.6 MHz based plan only would require, at most, minor equipment retrofitting using existing technology and thus would not favor any single manufacturer's product line; would promote vigorous competition in the microwave equipment market; and would be the most cost-effective. The Joint Commenters' channel plan has numerous serious defects which would jeopardize microwave operations and future system growth significantly. All the misplaced chauvinism distorting the record of this proceeding cannot change these basic facts.

ANS respects the need to ensure a prompt and seamless relocation of 2 GHz fixed point-to-point microwave users to facilitate implementation of PCS. It has been ANS which has cleared

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[4]Letter, dated May 5, 1993, from Congressmen Markey, Fields and Bacchus to Chairman Quello.

the way for this reallocation by submitting a comprehensive plan for operation by these former 2 GHz users in the higher bands.[5]

Not only did ANS initiate this process, it has worked aggressively with the Commission and the microwave industry to reach a consensus on an overall plan. Based upon the record of this proceeding ANS, in its Modified Plan, suggested several changes that would accommodate the needs of all users and manufacturers.[6] All that remains is reaching an accord on the channel plan.

Even though its 1.6 MHz plan is the most appropriate for microwave users, ANS recognizes that, despite its efforts, the politicalization of this proceeding precludes achieving any industry consensus on this issue in the immediate future. Absent such a consensus, the attendant regulatory delay would cause unnecessary and harmful uncertainty within the microwave industry.

THE COMPROMISE PLAN MEETS THE NEEDS OF THE MICROWAVE INDUSTRY, INCLUDING THE JOINT COMMENTERS

Under these circumstances, ANS believes that industry unity, instead of industry in-fighting, would serve the public interest best. Even though the record demonstrates that, based on the only appropriate standard - - technical merit - - the Alcatel Modified Plan compels adoption, the needs of the microwave industry cannot be held hostage to continued political skirmishing. Accordingly, herein, ANS submits its Compromise Plan, which is based on the Joint Commenters' 2.5 MHz plan, for Commission and industry consideration. However, to ensure that

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[5]See ANS' Petition for Rule Making, filed May 22, 1992 (RM-8004) ("Petition").

[6]For example, in the Modified Plan, ANS agreed to retaining 29.65 MHz spacing, instead of the 30 MHz spacing proposed in the Petition, because that is what the industry wanted. Similarly, in response to satellite user concerns, ANS proposed revisions, in the Modified Plan, to its 4 GHz band rechannelization. In general, these revisions were received favorably by the satellite interests.

the microwave industry is given a set of rules that would complement, instead of disrupt, their short-term and long-term operations, ANS, in its Compromise Plan, corrects the numerous flaws in the Joint Commenter Plan.

As detailed in Attachment A, this Compromise Plan synthesizes the Joint Commenter Plan and the Alcatel Modified Plan because it:

* Retains the 3.75, 2.5, and 1.25 MHz channel bandwidths proposed in the Joint Commenter Plan;

* Retains the 800 and 400 KHz channel bandwidths proposed in the Alcatel Modified Plan;

* Adopts the spectrum efficiency requirements from the Joint Commenter Plan for narrow band systems (5 MHz or less) and adopts the spectrum efficiency requirements for wideband systems (10 MHz or greater) from the Alcatel Modified Plan;

* Phases in the spectrum efficiency requirements after a 2 year transition period;

* Relocates 3.75 MHz channels so that they will not block multiple 5 and 10 MHz channels;

* Gives microwave users the option to concatenate multiple contiguous channels, thereby increasing planning flexibility;

* Removes 40 MHz wideband channels (originally proposed by the Joint Commenters), retains 10 and 20 MHz channels and removes narrow band channels in the 4 GHz band;

* Removes temporary 15 MHz channels from the 6 GHz common carrier band (originally proposed by the Joint Commenters);

* Adopts the upper 6 GHz and 11 GHz band channelizations from the Alcatel Modified Plan, thereby providing more channels than the Joint Commenter Plan and correcting material technical problems in the Joint Commenter Plan;

* Adds narrow band channels to the 11 GHz band, as proposed by the Joint Commenters, and relocates these channels so that they will not overlap more than two wideband 30 or 40 MHz channels; and

* Optimizes access to the maximum number of 10 GHz channels, as advocated by the Joint Commenters.

In developing the Compromise Plan, ANS was careful to equal or exceed all the benchmarks identified by the Joint Commenters as essential to any channel plan:[7]

* BETTER PATH RELIABILITY - The Compromise Plan adopts the 3.75, 2.5, and 1.25 MHz channel bandwidths and spectrum efficiency requirements from the Joint Commenter Plan. As a result, less complex modems can be used, improving path reliability. The Compromise Plan also allows less complex modems to be used in 2 DS3 wideband radios, improving path reliability.

* LOWER COST SYSTEMS - System upgrades will be less costly under the Compromise Plan. The Joint Commenter Plan requires expensive 128 QAM modems to be used to upgrade system capacity. The Compromise Plan permits the use of concatenated channels, as an option, allowing less complex modems to be used in system upgrades, thereby reducing the cost to the microwave user.

* BROADER SELECTION OF EQUIPMENT - The Compromise Plan makes specific provision for low capacity analog radios employing 800 and 400 KHz bandwidths in the lower 6 GHz, upper 6 GHz, and 10.5 GHz bands. The Joint Commenter Plan does not. These low capacity channels also will encourage the development of new microwave products to address new markets, such as the interconnection of PCS cell sites.

* WIDER CHOICE OF SUPPLIERS - The Compromise Plan provides fair and unbiased access to the radio spectrum for all microwave users, including: narrow band and wideband users, digital and analog users, and common carrier and private users. This unbiased access will encourage the widest possible choice of microwave equipment suppliers. Thus, this Compromise Plan does not favor any microwave manufacturer.

* REUSE OF EXISTING EQUIPMENT POSSIBLE - The Compromise Plan allows all manufacturers to reuse existing 2 GHz modems and other equipment.

* IMPROVED SPECTRUM UTILIZATION - The Compromise Plan corrects a

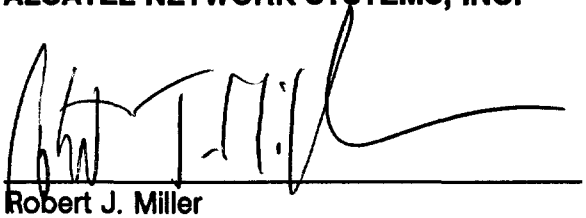
* LESS EQUIPMENT OBSOLETED - The Compromise Plan spectrum efficiency requirements generally maintain the status quo in most bands. Therefore, most existing equipment will be unaffected by the new requirements.

CONCLUSION

ANS' Compromise Plan is a platform which meets all the stated needs of the Joint Commenters, the TIA and the microwave users. More importantly, it answers all the objections to the 1.6 MHz-based plan submitted in the record of this proceeding. ANS still has significant concern regarding adequate spectrum in the long term. Nevertheless, ANS offers this compromise to accommodate those manufacturers currently unable to provide high spectrum efficiency equipment. Consequently, the Commission now has the opportunity to expeditiously permit public comment on this proposal to ensure prompt adoption of rules governing operation by 2 GHz microwave users in the bands above 3 GHz.

Respectfully submitted,

ALCATEL NETWORK SYSTEMS, INC.



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Dated: May 19, 1993

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ATTACHMENT A

COMPROMISE CHANNEL PLAN

FURTHER NOTICE OF PROPOSED RULE MAKING
FEDERAL COMMUNICATIONS COMMISSION
ET Docket 92-9
RM-8004

Composed by
Alcatel Network Systems, Inc.
Technical Staff

May 14, 1993

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1. INTRODUCTION

Throughout this proceeding, Alcatel Network Systems, Inc. ("Alcatel") has attempted to mediate among the many parties affected by the 2 GHz reallocation. Driven by Alcatel's efforts, industry consensus has been reached on a number of issues, including: the sharing of all common carrier and private bands from 4 to 11 GHz, the maintenance of existing 29.65 and 40 MHz frequency spacings in the 6 and 11 GHz common carrier bands, and the need for prior coordination in all affected bands.

Different channel plans have been proposed. Alcatel,[2] in its Modified Plan, proposes a 1.6 MHz-based channel plan.[2] Harris Corporation-Farinon Division, Digital Microwave Corporation, and Telesciences, Inc. (collectively, the "Joint Commenters") and the Telecommunications Industry Association Point-to-Point Communication Section ("TIA") propose a 2.5 MHz-based channel plan.[3]

There is no industry consensus regarding these channel plans and associated spectrum efficiency requirements. One industry group, including Western Multiplex, Burlington Northern, and Colorado Interstate Gas, join Alcatel in supporting the Alcatel Modified Plan. Another group, including Harris-Farinon, Telesciences, DMC, and TIA, supports the Joint Commenter Plan.

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1. Further Notice of Proposed Rule Making, ET Docket No. 92-9, 7 FCC Rcd 6100 (1992) ("FNPRM").

2. Alcatel Network Systems, Inc., Reply Comments to ET Docket No. 92-9, January 26, 1993, Technical Staff Report ("Alcatel Modified Plan").

3. Joint Comments of Harris Corporation-Farinon Division, Digital Microwave Corporation, and Telesciences, Inc., ET Docket No. 92-9, December 11, 1992; Comments of the Telecommunications Industry Association Fixed Point-to-Point Communications Section, ET Docket No. 92-9, December 11, 1993; Reply Comments of Telesciences, Inc., Harris Corporation-Farinon Division, and Digital Microwave Corporation, ET Docket No. 92-9, January 27, 1993; Reply Comments of the Fixed Point-to-Point Communications Section of the Telecommunications Industry Association, ET Docket 92-9, January 27, 1993 (collectively, "Joint Commenter Plan").

In recent discussions with Alcatel, the Commission expressed an interest in using the Alcatel Modified Plan in some bands and using the Joint Commenter Plan in other bands. Alcatel does not support this approach. Due to the high cost of modem development, most manufacturers use the same modem designs in all frequency bands. It is not cost effective to design radios for different channel bandwidths and spectrum efficiencies in different bands.

The Alcatel Modified Plan is preferable to the Joint Commenter Plan because it is significantly more spectrally efficient and because it is pro-competitive. Nevertheless, Alcatel recognizes that, despite its efforts, industry consensus on this issue is highly unlikely. Any delay in selecting a channel plan is not in the public interest and would create unnecessary uncertainty in the microwave industry. Thus, to facilitate the relocation of fixed point-to-point microwave users from the 2 GHz band, Alcatel proposes a Compromise Plan, detailed herein, incorporating the best features from the Alcatel Modified Plan and from the Joint Commenter Plan.

The Compromise Plan adopts the Joint Commenters' proposed 1.25, 2.5, and 3.75 MHz channels. It deemphasizes the use of the 4 GHz band, minimizing satellite interference, and maintains the status quo regarding spectrum efficiency requirements. As a result, the Compromise Plan will have a minimal impact on any manufacturer's equipment.

2. SUMMARY OF THE COMPROMISE PLAN

* Retain the 3.75, 2.5, and 1.25 MHz channel bandwidths as proposed in the Joint Commenter Plan.

* Retain the 800 and 400 KHz channel bandwidths as proposed in the Alcatel Modified Plan.

* For narrow band systems (5 MHz or less), adopt the spectrum efficiency requirements from the Joint Commenter Plan.

* For wideband systems (10 MHz or greater), adopt the spectrum efficiency requirements from the Alcatel Modified Plan.

* Phase in the spectrum efficiency requirements after a 2 year transition period.

* Relocate the 3.75 MHz channels so that they will not block multiple 5 and 10 MHz channels.

* Permit concatenation of multiple contiguous channels. All channels to be concatenated must have equal bandwidths.

* Remove 40 MHz wideband channels from the 4 GHz band (originally proposed by the Joint Commenters).

* Retain 10 and 20 MHz channels in the 4 GHz band.

* Remove narrow band channels from the 4 GHz band (originally proposed by Alcatel).

* Remove temporary 15 MHz channels from the 6 GHz common

3. ANALYSIS OF THE CHANNEL PLANS

3.1 3.7 - 4.2 GHZ COMMON CARRIER BAND

The Compromise Plan for the 4 GHz band is shown in Figure 1.

3.1.1 40 MHZ WIDEBAND CHANNELS

Following the recommendation of Northern Telecom, the Joint Commenters propose a new 40 MHz channel plan in the 4 GHz band for high capacity trunk systems. Satellite interests strongly oppose the 40 MHz channels because they are co-channel to existing transponder frequencies.[4] Since there is no frequency separation between terrestrial and satellite frequencies, notch filters cannot be used to reduce interference levels. For this reason, the Compromise Plan does not include 40 MHz channels.

3.1.2 NARROW BAND CHANNELS

In its Modified Plan, Alcatel proposes a new 4 GHz channelization that adds narrow band channels and maintains the current 10 MHz spacing between terrestrial and satellite transponder frequencies. Satellite manufacturers, such as Hughes and GE Americom, prefer this new channelization to the plan proposed by the Commission in the FNPRM, but they still are concerned about adding a large class of new point-to-point microwave users to the 4 GHz band.[5]

Alcatel demonstrates, in its Modifed Plan, that the vast majority of 2 GHz point-to-point microwave users employ bandwidths of 5 MHz or less.[6] Therefore, if narrow band channels of 5 MHz or less are removed from the 4 GHz plan, satellite users will be largely unaffected by the 2 GHz relocation.

To address these satellite user concerns, narrow band channels of 5 MHz or less are removed from the Compromise Plan. The only remaining bandwidths in the Compromise Plan are 10 and 20 MHz wideband channels.

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4. GTE Service Corporation, Reply Comments to ET Docket No. 92-9, January 27, 1993, at p. 1.

5. Hughes Communications Galaxy, Further Comments to ET Docket No. 92-9, March 10, 1993, at p. 2; GE American Communications, Further Comments to ET Docket No. 92-9, March 10, 1993, at p. 3.

6. Alcatel Modified Plan at p. 21.

3.1.3 FREQUENCY PAIRINGS

In its Modified Plan, Alcatel proposes a standard "high-low" frequency pairing plan for the 4 GHz band that will allow a common antenna to be used for transmitters and receivers (2 antennas per path).[7] The old AT&T pairing plan proposed by the Joint Commenters requires separate transmit and receive antennas on every path (4 antennas per path) due to the small transmit-receive frequency spacing.[8] Therefore, the frequency pairings in the Alcatel Modified Plan are the most cost effective and are used in the Compromise Plan.

In addition, under the current FCC Part 21 rules, frequency pairings are recommended and are not mandatory. Therefore, interexchange carriers are free to use the old AT&T pairings on high capacity trunk systems if required.

3.2 5.925 - 6.425 GHZ COMMON CARRIER BAND

The Compromise Plan for the 6 GHz common carrier band is shown in Figure 2.

3.2.1 HIGH CAPACITY CHANNELS

Both Alcatel and the Joint Commenters agree on the 30 MHz, 10 MHz and 5 MHz channel plans for the 6 GHz band. These plans assume a 30 MHz authorized bandwidth and a 29.65 MHz frequency spacing. Frequency spacings for narrower bandwidths are scaled accordingly.

The Joint Commenters propose a temporary 15 MHz channel plan to remain in effect until 1997.[9] Using 16 QAM or 25 QPRS modulation, it is possible to carry 1 DS3 of traffic in 15 MHz of bandwidth.

In its Modified Plan, Alcatel shows that all major microwave manufacturers have type accepted 1 DS3 radios occupying 10 MHz of bandwidth in the 6 GHz band.[10] As a result, the 15 MHz channel proposal is spectrally inefficient, unnecessary, and not included in the Compromise Plan.

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7. Alcatel Modified Plan at pp. 5-6.

8. Joint Commenters, Comments to ET Docket No. 92-9, December 11, 1992, at pp. 8-9.

9. Joint Commenters, Comments to ET Docket No. 92-9, December 11, 1992, at pp. 7-8.

10. Alcatel Modified Plan, Figure 21.

3.2.2 MEDIUM CAPACITY CHANNELS

The Compromise Plan includes 3.75, 2.5, and 1.25 MHz channels as recommended by the Joint Commenters.[11] However, several necessary changes to the Joint Commenter Plan have been made.

First, many of the 3.75 MHz channels defined by the Joint Commenters overlap two 5 MHz or 10 MHz channels. This is an extremely poor frequency planning practice. Under the Joint Commenter Plan, if a large number of 3.75 MHz channels are coordinated in a particular geographic area, it will be very difficult to coordinate 5 or 10 MHz channels. To correct this problem, the Compromise Plan relocates the 3.75 MHz channels so that they fit entirely within a 5 MHz channel. This reduces the number of channels, but improves overall spectrum management. The Joint Commenter 3.75 MHz channel problem is shown in Figure 6. The Alcatel solution is shown in Figure 7.

Second, all of the 3.75 MHz channels in the Joint Commenter Plan are offset by 10 KHz from the overlapping 1.25 MHz channels.[12] For analog radios, this frequency offset will produce carrier beat problems. For digital radios, a frequency change would be required to upgrade from 2 DS1's in 1.25 MHz to 8 DS1's in 3.75 MHz. The Compromise Plan corrects this problem.

Third, the Compromise Plan defines additional 3.75, 2.5, and 1.25 MHz channels in the center of the band. These unpaired channels can be used in a one-way "simplex system" or if a paired frequency is blocked. The Joint Commenters left this spectrum vacant, reducing the number of available channels.

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11. Joint Commenters, Comments to ET Docket No. 92-9, December 11, 1992, at p. 5.

12. Ex Parte Notice, dated April 7, 1993, in ET Docket No. 92-9, filed by the Joint Commenters, Appendix C at pp. 2-4.

3.2.3 LOW CAPACITY CHANNELS

In its Modified Plan, Alcatel proposes 800 and 400 KHz channels at the band edges and center gap of the 6 GHz band. The Compromise Plan retains these channels to meet the needs of displaced low capacity 2 GHz microwave users.

As noted by UTC,[13] there are over 13,000 "skinny route" systems in the 2 GHz band employing bandwidths of 800 KHz and 1.6 MHz. To prevent the widespread blocking of 10 and 30 MHz wideband channels, it is preferred that these low capacity systems be coordinated in the band edge channels. More systems can be accommodated using 800 KHz channels than 1.25 MHz channels.

Currently, most 2 GHz microwave systems are analog. Although many relocating 2 GHz systems will convert to digital, a significant number may remain analog due to the low cost of analog radios. Analog radio manufacturers, like Western Multiplex, strongly favor the 800 KHz channels.[14]

For these reasons, the Compromise Plan retains the 800 and 400 KHz channels. The Joint Commenter Plan unnecessarily ignores the needs of analog microwave users, and any adoption of a 2.5 MHz-based plan should not perpetuate this flaw.

The Joint Commenters propose 2.5 and 1.25 MHz channels in the band edges and center gap of the 6 GHz band.[15] The Compromise Plan retains these channels.

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13. Utilities Telecommunications Council ("UTC"), Reply Comments to ET Docket 92-9, at pp. 5-6.

14. Western Multiplex, Burlington Northern, and Colorado Interstate Gas, Reply Comments to ET Docket 92-9, January 21, 1993, at p. 2.

15. Ex Parte Notice, dated April 7, 1993, in ET Docket No. 92-9, filed by the Joint Commenters, Appendix C at pp. 3-4.

3.2.4 SYSTEM GROWTH PLAN

A significant advantage of the Alcatel Modified Plan is the ability to increase system capacity without changing the frequency or polarization. Because each 5 MHz channel is subdivided into three 1.6 MHz channels, the center 1.6 MHz channel is at the same frequency as the associated 5 MHz channel. Systems easily can grow from 1.6 MHz to 5 MHz (4 DS1 to 12 DS1) as traffic requirements increase.

If traffic does not increase as predicted and an upgrade is not required, other microwave systems can use the two 1.6 MHz channels on either side of the center 1.6 MHz channel. As a result, the total transmission capacity of the 5 MHz channel is preserved. Upgrades may be performed on 10 MHz channels using a similar procedure. The upgrade method from the Alcatel Modified Plan is shown in Figure 8.

In the Joint Commenter Plan, capacity upgrades usually require a frequency or polarization change because the center frequencies of the 3.75, 2.5, and 1.25 MHz channels are offset from each other (see Figure 6). Since capacity upgrades are more difficult and expensive, system operators will tend to install more capacity than is initially required (i.e., warehouse spectrum).

The Joint Commenters suggest that more complex modulators could be used within the same channel bandwidth to upgrade system capacity.[16] For example, a 16 QAM radio carrying 4 DS1's in a 2.5 MHz bandwidth could be upgraded to a 128 QAM radio carrying 8 DS1's in the same bandwidth.

The problem with the Joint Commenters' approach is that the path will experience a significant 9 dB loss in system gain by converting from 16 QAM to 128 QAM, requiring much larger antennas. To make up 9 dB in system gain, it is necessary to upgrade 8 foot antennas to 15 foot antennas in the 6 GHz private band. This requirement would have a major impact on the tower structural loading.

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16. Ex Parte Notice, dated April 28, 1993, in ET Docket No. 92-9, filed by the Joint Commenters, Appendix B, Figure 10.

In order to provide an easier upgrade method and eliminate this serious flaw in the Joint Commenter Plan, the Compromise Plan recommends that concatenated channels be permitted as an option. This is shown in Figure 9. Note that, in the 5 MHz channel at the far left of the drawing, the two 1.25 MHz channels in the center of the 5 MHz channel are concatenated into a 2.5 MHz channel. This concatenated 2.5 MHz channel has the same center frequency as the associated 5 MHz channel.

Using concatenated channels, a 4 DS1 system in 2.5 MHz can grow to a 12 DS1 system in 5 MHz without a frequency or polarization change. The effect on system gain is minimal since the same type of modulators can be used. Frequency coordination is also simplified since the co-channel carrier-to-interference requirements are the same for the 4 DS1 and 12 DS1 versions of the radio.

If traffic does not increase as expected and an upgrade is not required, 2 DS1 radios can be coordinated in the 1.25 MHz channels on either side of the 2.5 MHz concatenated channel. Therefore, the total traffic carrying capacity of the 5 MHz channel is maintained.

The Compromise Plan allows upgrades in the following cases without a frequency or polarization change:

0.4	to 1.25 MHz	(1 DS1 to 2 DS1)		
0.8	to 2.5 MHz	(2 DS1 to 4 DS1)		
1.25	to 3.75 MHz	(2 DS1 to 8 DS1)		
2.5	to 5.0 MHz	(4 DS1 to 12 DS1)		
10	to 30 MHz	(1 DS3 to 2 DS3)		
10	to 30 MHz	(1 DS3 to 3 DS3)		
	30 MHz	(2 DS3 to 3 DS3)	(16 QAM to 64 QAM)	

Channels may be protected for future growth by filing for prior coordination with a frequency planning company. Channels may be released to other microwave users by not renewing the prior coordination. If no frequencies are available due to frequency congestion, microwave users may obtain an unoccupied growth channel by using the procedure established by the National Spectrum Managers Association ("NSMA").

Under the Compromise Plan, manufacturers are free to adopt the upgrade strategy proposed by the Joint Commenters: using more complex modems in the same bandwidth. Alternatively, the Compromise Plan allows the Alcatel approach to be used: using modems with the same modulation complexity in a wider bandwidth. Thus, the Compromise Plan allows the market to decide the best upgrade strategy.

3.3 6.525 - 6.875 GHZ OPERATIONAL FIXED BAND

The Compromise Plan for the upper 6 GHz operational fixed band is shown in Figure 3.

3.3.1 CHANNEL PLAN

[redacted]

3.3.2 SYSTEM GROWTH PLAN

Figure 12 shows the system growth plan associated with the Compromise Plan. There are several upgrade paths. Unlike the Joint Commenter Plan, which does not permit concatenated channels,[19] use of concatenated 2.5 MHz channels would allow upgrades from 2.5 to 5 MHz or 2.5 to 10 MHz channels without a frequency or polarization change. The growth plan for the Joint Commenter Plan is shown in Figure 13.

Special note should be taken of the interstitial 5 MHz channels (see NOTE 2 in Figure 12). These channels originally were intended to allow narrow band analog systems to be coordinated between 10 MHz systems. However, digital radios have much broader transmit spectrums than analog radios. Therefore, in congested metropolian areas, it will be very difficult to coordinate 2.5 MHz channels within the 5 MHz interstitial channels because they are not centered between 10 MHz channels.

Figure 12 shows that 2.5 MHz concatenated channels, consisting of two 1.25 MHz channels combined together, are centered between 10 MHz channels. As a result, these concatenated channels will be significantly easier to coordinate than the normal 2.5 MHz interstitial channels.

The Joint Commenter Plan does not permit concatenated channels. This is a serious disadvantage, since many of the 2.5 MHz interstitial channels cannot be used if concatenation is unavailable. The 2.5 MHz channel problem is shown in Figure 13.

3.4 10.55 - 10.68 GHZ BAND

The Compromise Plan for the 10 GHz band is shown in Figure 4.

In the Compromise Plan, channel bandwidths of 5, 3.75, 2.5, and 1.25 MHz are defined across the point-to-point and point-to-multipoint sections of the band. The Compromise Plan also retains the 800 and 400 KHz channels, as proposed in the Alcatel Modified Plan.

In the Compromise Plan, three of the existing 3.75 MHz channels are relocated from their current location in the point-to-point section of the band (10.550 to 10.565 MHz and 10.615 to 10.630 MHz). This relocation is necessary to prevent overlap of the 3.75 MHz channels with two 5 MHz channels. The Joint Commenters Plan includes such an overlap.

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19. Joint Commenters, Comments to ET Docket No. 92-9, December 11, 1992, at p. 10.

This relocation should not present a problem. As shown in Figure 14, it is possible to concatenate three 1.25 MHz channels to form one of the existing 3.75 MHz channels. In the rare cases where a new 3.75 MHz channel cannot be used due to frequency congestion, concatenated 3.75 MHz channels can be used. It should be noted that the current 3.75 MHz channelization was adopted only 3 years ago. As a result, relatively few systems have been coordinated using the existing plan.

3.5 10.7 - 11.7 GHZ COMMON CARRIER BAND

The Compromise Plan for the 11 GHz common carrier band is shown in Figure 5.

3.5.1 WIDEBAND CHANNELS

Both the Alcatel Modified Plan and the Joint Commenter Plan use the existing DE frequency plan for the 40 MHz channels and the existing PJ frequency plan for the 30 MHz channels.[20]

The Joint Commenter Plan omits two existing 40 MHz channels (designated 5E and 9D in Figure 15), reducing the number of 40 MHz channel pairs from 12 to 11. The Alcatel Modified Plan retains these channels.

The Joint Commenter Plan defines 12 pairs of 30 MHz channels. The Alcatel Modified Plan defines a new 30 MHz pair in the vacant 60 MHz gap in the center of the band. This increases the number of 30 MHz pairs from 12 to 13.

The Joint Commenter Plan defines 47 pairs of 10 MHz channels. The Alcatel Modified Plan defines 50 pairs of 10 MHz channels.

Since the Alcatel Modified Plan defines more channels for the 40, 30, and 10 MHz bandwidths, these channelizations are used in the Compromise Plan.

The Joint Commenters also propose a 20 MHz channel plan. The Compromise Plan does not include this channelization because the 20 MHz channels in the Joint Commenter Plan are offset by 5 MHz from the 10 MHz channels. As a result, each 20 MHz channel effectively occupies 30 MHz of useable spectrum. However, since the Compromise Plan allows the concatenation of adjacent channels, two 10 MHz channels can be concatenated if a 20 MHz channel is required.

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20. Joint Commenters, Comments to ET Docket No. 92-9, December 11, 1992, Appendix A.

4. SPECTRUM EFFICIENCY REQUIREMENTS

The following are the proposed spectrum efficiency requirements for the Compromise Plan:

Nominal Channel Bandwidth (MHz)	Minimum Payload Capacity (Mbit/sec)	Minimum Traffic Loading Payload (as percent of payload capacity)	Typical Utilization
0.40	1.54	n/a	1 DS1
0.80	3.08	n/a	2 DS1
1.25	3.08	n/a	2 DS1
2.50	6.17	n/a	4 DS1
3.75	12.3	n/a	8 DS1
5.0	18.5	n/a	12 DS1
10.0	44.7	50	1 DS3/STS1
20.0	89.4	50	2 DS3/STS1
30.0	89.4	50	2 DS3/STS1
40.0	134.1	50	3 DS3/STS1

(a) Stations licensed after [Report and Order date + 2 years] are required to meet the minimum payload capacity and traffic loading requirements. Stations licensed prior to the effective date are grandfathered and may continue their authorized operations.

(b) For all bands, concatenation of multiple contiguous channels is permitted as long as the minimum payload capacity requirements are met. All channels to be concatenated must have equal bandwidths.

(c) Except for video transmission, an application for an initial working channel will not be accepted for filing where the anticipated loading (within five years or other period subject to reasonable projection) is less than the minimum specified....[22]

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22. 47 CFR Part 21.710(c).